PORTRAIT *By Corydon G. Snyder*

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ENLARGING FROM LIFE IN THE CAMERA.

BY H. L. FAIR.

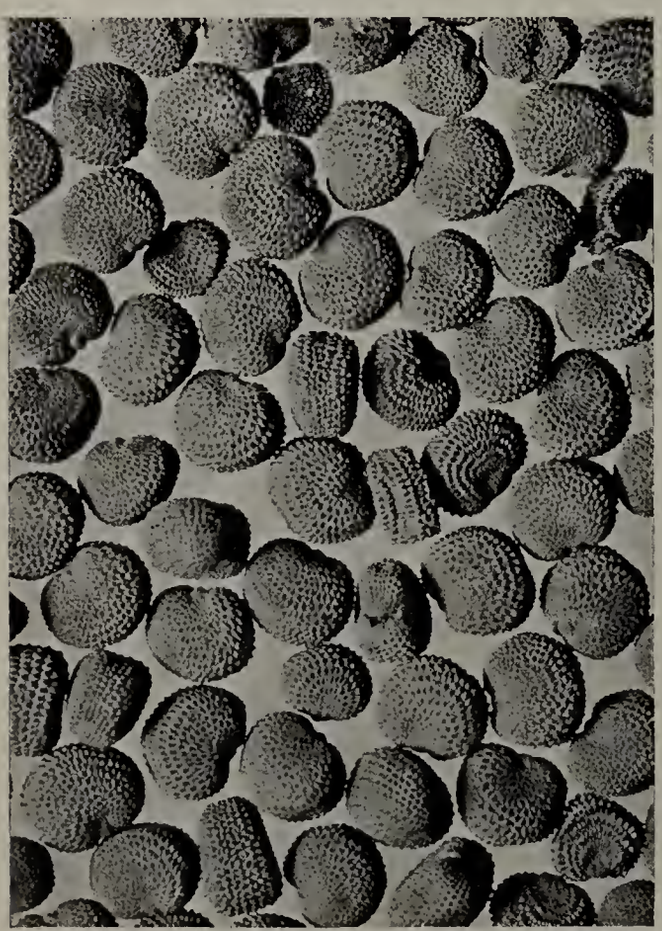
THE search for a specialty is no mean part of the education of the modern amateur photographer. Usually he gets to a point in his work where the miscellaneous taking of everything in sight, from his family in the back yard, to the whole country side in one picture, is somewhat unsatisfying, and he casts around for some special field in which his talents can have wider play by being more sharply focussed. Of the hundreds of such special fields, one is photomicrography. But photomicrography as it is ordinarily considered means an expensive instrument in addition to the camera, and considerable knowledge of allied sciences, as botany, entomology and particularly microscopy, in the preparation of the objects to be photomicrographed.

If the worker is not after too high a magnification, however, there is a very simple and effective means of making photomicrographs which requires no additional apparatus which can not be easily and quickly constructed at home, and which gives most beautiful results. This method while nothing new in principle, has been newly worked out in practice by Prof. F. Lamson Scribner of the Department of Agriculture. Prof. Scribner is ex-chief of the Division of Agrostology (which is the science of seeds and grasses) ex-chief Insular Department of Agriculture in the Philippines, was in charge of the government exhibit of his department in Portland, Ore., at the time of the Exposition, and will have charge of the same exhibit at Jamestown this summer.

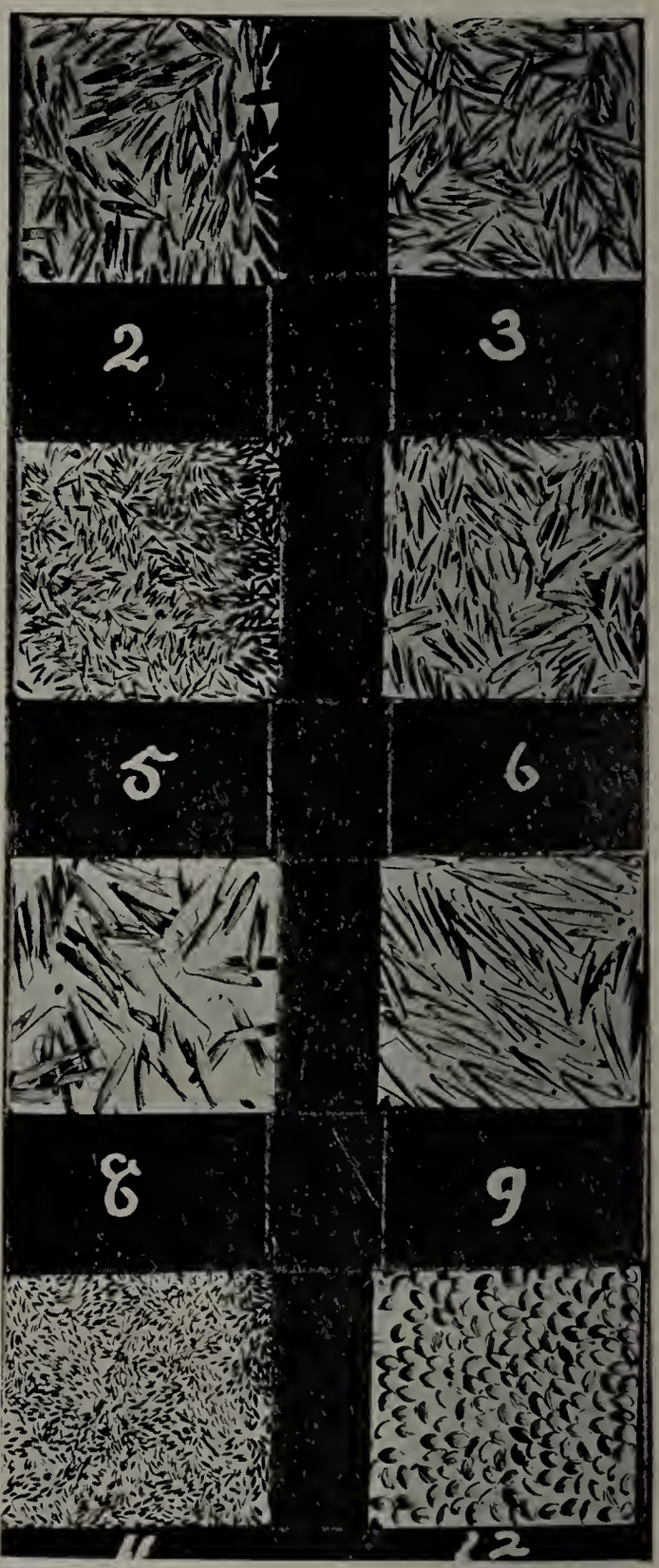
At Portland, Ore., the government exhibited seeds through microscopes. This was excellent as far as it went, but precluded many people seeing the exhibit at once, and gave small chance for comparison. Casting around for some better method, Prof. Scribner, a photographic technician whose negatives and prints are the despair of his friends, so good are they, thought of photographing the seeds. But photographs of seeds could not be made, said those who had tried it and experimented with it, in the seed division. Drawings were the only things which were satisfactory. Prof. Scribner was obstinate enough not to believe this until he tried it,—and after a little experimenting and arranging of apparatus he commenced bringing seed photographs down

to the department which were the delight of every one connected with the work. The writer was not present at the time of the advent of the first seed photograph, but judging from the enthusiasm of Prof. Duval of the Pure Seed Investigation Department, over them, the original demonstration must have been somewhat hearty.

Reproduced with this article are some of these seed photographs,—a magnification of nine diameters (eighty-one times) of the seeds of the Silene, or night blooming catch fly odengone. In another photograph are seen average seeds life size.



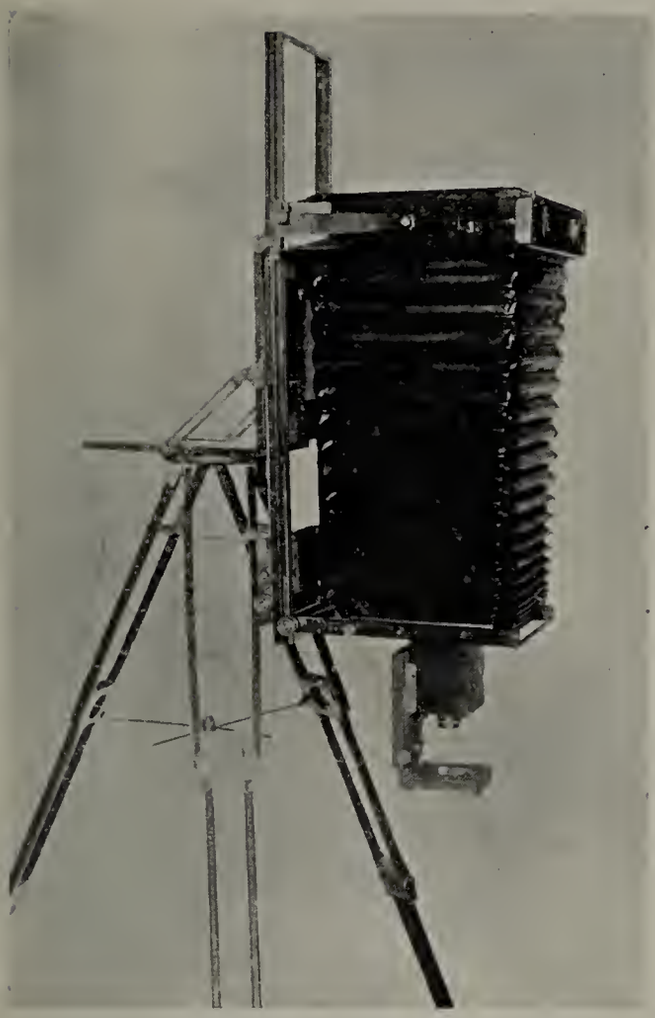
SILENE SEEDS
Magnified nine diameters. Photographed by Prof. F. Lamson Scribner



SEEDS NATURAL SIZE
Photographed by Prof. F. Lamson Scribner

Before going any further let us clearly understand about that diameter and times statement. A magnification of nine diameters means, of course, that the diameter of the object so magnified is nine times its original diameter. A one inch object magnified nine diameters is nine inches across. But it is nine inches across each way. And a square inch, will go eighty-one times into a square nine inches each way. So we square the magnification in diameters to get the number of times, or areas that the magnification produces.

The apparatus which produces these

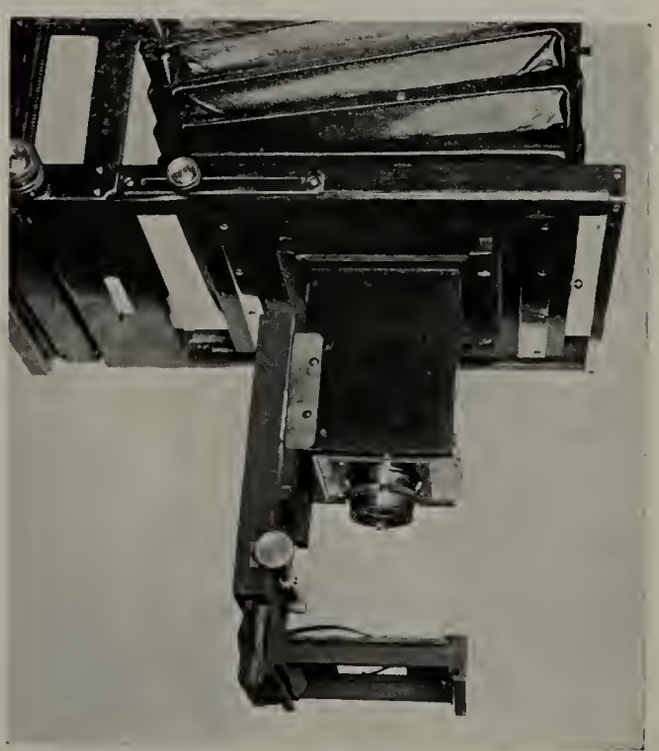


Camera and stand as used by Prof. Scribner for Seed Photography

seed photomicrographs consists of a camera of fairly long draw, a means for holding it verticle, a short focus lens, and, if possible, but not essential, a means for focussing that lens in a minute manner. In Figure one, the apparatus is shown as Prof. Scribner uses it. On top of his tripod is the folding arrangement which is similar to the one made and sold by Folmer and Schwing, but much larger and which is easily constructed at home with two boards hinged, an old tripod screw, an old bed plate from a camera for bed plate screw to fit in, and two sliding brass pieces with set screws, to be purchased from any large hardware store under the name of desk sliding braces. Folmer & Schwing's device is excellent for the cameras they are made to fit. They are sold to support the let down part of desks,—the binding screw is any winged nut and bolt. The tripod can be held rigid with any means at command,—a Mellen's tripod stay is used in the illustration, and probably there is nothing better.

To the front board is attached a box carrying the lens and the bed of the sliding object carrier, which is actuated in a forward and back movement by the rack and pinion, which can also be obtained from hardware stores. If the bed for the object carrier be attached to the bed of the camera instead of to the front board, the object carrier need have no independent movement of its own, focussing being done by the front and back focus of the instrument, but this is less satisfactory, particularly when accurate determinations of diameter magnification are to be done, when the distance from lens to plate must remain constant and at a predetermined distance.

Prof. Scribner uses a Goerz lens for this work with a normal focal length of 2⅜ inches. With a bellows draw of thirty inches, this allows a possible magnification of about twelve, although most of the work is done at a magnification of



STAND AND DETAILS
Note rack and pinion and moving seed support

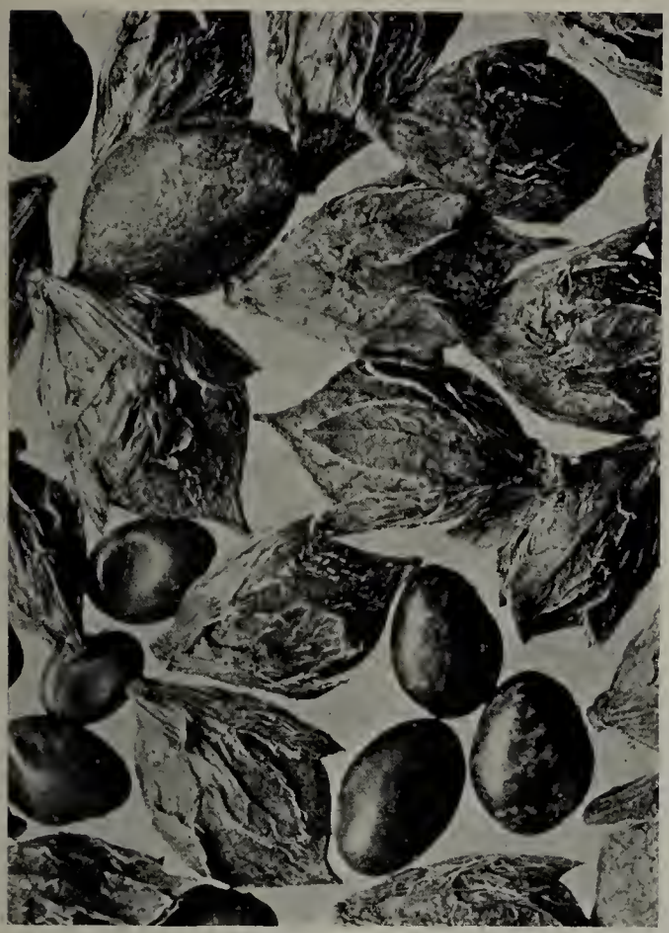
nine inches. The degree of magnification can be determined in two ways. A seed is accurately measured with a scale under the microscope, and the image resulting from the photograph is measured with dividers and micrometer rule. The amount the one is contained in the other expresses the magnification in diameters. The other way is to compare focal length with the draw. As the focal length of the lens changes on each side with every increase and decrease of magnification the method to be pursued is as follows: Measure the distance from the seed carrier to the diaphragm, and the distance from the diaphragm to the plate. If the one is three inches and the other is twenty-seven inches, the magnification is nine diameters, three being contained into twenty-seven nine times.

As may be imagined the focussing of small objects, like seeds, resting on the glass of the carrier is a somewhat dainty matter. To facilitate matters, a small microscopic cover glass is cemented to the ground glass side of the ground glass of the camera, preferably with a drop of Canada balsam, but almost any adhesive will do,—shellac, glue, or glycerine for temporary work. A cross mark should be made on the ground glass with pencil before the cover glass is cemented on. A focussing glass is then employed, and focussed on the cross mark. The focussing of the object is then accomplished with the rack and pinion,—anything may be employed as a focussing device, which permits the alteration of distance between lens and object. Preferably, it is the object which should move instead of the lens, as explained, for moving the object does not alter the relation of the lens and ground glass.

For white background work, the Professor uses a reflector of white, placed at an angle beneath the seed carrying glass, and also a ground glass to diffuse the light. He sets the apparatus up near a north window and gives an exposure which varies from two to twenty minutes according to the stop used and color and magnification of the seeds. If a black ground is to be employed, the light is cut off from beneath the seeds and light allowed to fall only on top of them. As in either case light strikes from the top, as well as from the bottom, the effect is the same in both light and dark ground—of an object in relief with light and shade. It suffers none of the reversal from change of background which is so familiar with photomicrographs proper, in which objects made on a white ground are frequently only silhouettes.

The stop used is the largest, for focussing. Afterwards the stop is reduced to sixteen. It must be realized, however, that the stop marked as sixteen, means that it is one-sixteenth of the infinity focal length, two and three-eighths inches. With the focus extended by a close object and a long draw, this focal length is much greater and the stop much smaller in proportion. Take the case of a lens of eight inches focus, and a diameter of one inch. It works at F 8. If the draw is extended ten times, to eighty inches, the same stop becomes F 80. But F 8 is equal to U. S. 4 while F 80 is equal to U. S. 400 with one hundred times less area than U. S. 4 and so requiring one hundred times as long an exposure.

Thus in the lens under discussion, with a nine times magnification the magnified draw,—which is approximately ten times 2⅜ is about 24 inches,—making the stop F 80, as in the above example, considering fractions it is as follows: 2⅜x9 plus 2⅜ equal draw for ten times magnification. Draw divided by focal length gives factor to multiply stop by to obtain F value of stop. F value squared and divided by sixteen gives U. S. stop.



JAPANESE CLOVER
Magnified nine diameters. Photographed by Prof. F. Lamson Scribner

Working it out we have focal length required for ten times magnification (disregarding change of object to lens) as 23¾ inches, which divided by F or 2⅜ gives ten,—multiplying stop under discussion, 16, by ten we have 160 which is focal value of said stop. Squaring 160 and dividing by sixteen gives 1600 or the U. S. value of the stop at this draw.

There is no reason why this outfit should be confined to seed photography. Small flowers, small stones, earth, chemicals, particularly crystals, insects, of all sorts and kinds, and the thousand and one little things of daily life, all make beautiful and unique subjects for enlarged photographs, which are enlarged direct. Make no mistake. You cannot take these natural size and smaller and enlarge with the lantern and get these results. When you magnify a gelatine dry plate nine diameters,—making a four by five turn to a 36 by 45, you magnify the grains of silver in the negative and produce a result which will not stand close examination. These photographs of Professor Scribner's can be examined like any other photographs and show no more texture than will any print. The magnification has been of the object and *its* texture, not of the plate and its silver grains.

This may not be the place for it, but I cannot forbear calling the attention of my readers in general and one in particular to the question this one particular reader asked of me recently. "Why," he queried, "can't we take a photograph of the moon, with a fine telescope, enlarge it a thousand times or so, and see the detail we can't with a telescope? Why can't we enlarge a microscope picture until we can actually see the atom?" The reason, after the preceding paragraph, is too obvious to more than mention.

Germane to this subject in that it

Stand as used by Prof. Scribner for Photographing Negatives or Positives against the sky or for making copies

emanates from the same capable source, the idea here illustrated for making positives, enlarged negatives and other copies from any sort of transparencies or small sized original photos is worth noting. Prof. Scribner has a sub-stage rigged on his view camera which carries an upright frame, into which he can fasten plates or films for copying, reduction or enlargement. The same frame fits directly on the bed of another camera without a substage. With the tripod tilting stand he can easily point the rig directly at the blue sky from a north window, having then the most perfect and best light possible for enlarging or copying. Or if the copy to be made is from a photograph or painting, he has only to tilt the apparatus downwards, to get any kind of lighting he wishes. The frame is simple to make, and so effective when done that it seems worth specifying and illustrating. Its particular advantages are, of course, rigidity with the camera, absolute rectilinearity with the camera bed, the quality of staying in the same constant relation to the lens and plate throughout any accidental jar, and the convenience of tilting or moving camera and stand at one and the same time.

DANDELION SEED
Magnified nine diameters *Photographed by Prof. F. Lamson Scribner*

TAKING PICTURES OF ONE'S SELF.

BY CHARLES F. RICE.

I WONDER if my amateur photographer friends who lean toward "home portraiture" have ever sighed for a model with inexhaustible patience, one who will pose this way, that way or the other way—now turn the head a little more toward the light, then a little the other way—and so on, however, and whenever the photo-enthusiast wishes and all day long if need be. Such an ideal subject is within the reach of all of you, and he is ready whenever you are. You know who I mean by this time. It it yourself.

It's a whole lot of fun, besides being a means of gaining valuable experience in portrait work, and is withal very simple and easy.

All one needs out of the ordinary is an extra long rubber tube connecting the shutter with the bulb—say six feet. You will surely need this length, and if your lens is of longer focus than seven or eight inches, a tube ten or twelve feet long will be better. I advise you also to get a good big bulb to use with this long hose. Those that come with the shutters are ordinarily too small to use with the extra tubing.

It is taken for granted that you have set up your background, reflector and screen, or whatever accessories you generally employ in portrait work, and have the camera and the chair for the victim in approximately the right place.

Using the Mirror to see what the Lighting is, as directed in article

Getting the focus with rubber tube

In this case, the bulb was pressed with right hand, the tube passing behind or rather under the leg

Now to get the focus. If some one else will sit in the chair a moment and let you focus on him, so much the better. If not, focus on the back of the chair. When the focus is got right, and the camera fixed at the proper distance to give the right-sized image, take the long rubber hose that is attached to the shutter, and extend it to the point focussed on. Don't stretch it but draw it just taut enough so it will not sag. Now make a mark on the rubber tube with a pencil or piece of chalk at a point just opposite the point focussed on—that is, the same distance from the camera.

All you have to do then is to sit in the chair and so arrange the camera and chair that the mark on the rubber tube, when it is held taut, will just reach the point where the focus is desired to be sharpest. Then fire away at yourself. The hand that holds the bulb should be held low enough not to be included in the picture. If it is desired to include the hands, however, the bulb may be laid on the floor and pressed with the foot.

Use a small looking glass that can be held at arm's length to see when the lighting effect is right. Do not hold the mirror too near the face, or the light it reflects may reach the face and give a wrong idea of what the lighting is. Of course the mirror should be held on a line between the face and the camera.

There is difficulty in judging how much the lens is going to include on the plate, although you can tell pretty nearly by the position the back of the chair occupies on the ground glass. The best way is to have the camera far enough away so that the lens will surely take in enough. Then the proper placing of the figure on the print is easily accomplished by judicious trimming.

It is not my purpose here to say anything about the method of lighting, exposure and development. These of course do not differ whether you are your own subject or not.

You can make all kinds of experiments on yourself. Try it.

In taking this picture, the bulb was pressed with the foot

SOME MAXIMS ON DEVELOPMENT.

COMPILED BY J. W. LITTLE.

A PLATE well rocked during development will have more contrast because the action of the developer releases bromine from the silver bromide of the plate, which is immediately combined with the alkali, forming bromide, which remains at the place formed until rocked, thus protecting that place from the developer and so causing flatness. Therefore, under exposures should be fully developed but not rocked much during development, to avoid great contrasts.

By warming the developer, less contrast will be produced, as in the case of under exposed plates. The plate may first be hardened with formaline or an alum bath. Metol is a very suitable developer in this case.

For short exposures a very weak developer may be used, which should be changed every few minutes. It may even take an hour or two to develop the plate and it may look thin when taken from the fixing bath, but it will be more dense when dry.

Under exposure may be developed the same length of time as correct exposures and intensified if too thin.

Over exposures will give less contrast if developed at a low temperature, say at 40 to 60 degrees Fahrenheit.

For over exposures, use a solution of acetone sulphite 10 parts, edinol one part, water 100 parts, and add a portion (up to 25 per cent. in extreme cases) to developer as soon as over-exposure is shown in development.

Under exposure and over development produce granular images.

For over exposures, use bromide at the commencement. It will do no good after development has started. If not used at commencement, take plate from developer, wash, then put in fresh developer containing more pyro (although some bromide will do no hurt) and less alkali.

Eminent writers differ so widely concerning the subject of development, and their diverse theories are usually all so well borne out by the arguments advanced by the exponents of each, that it is not always easy to determine absolutely, even by actual test and practice, what really is or is not the correct way. For instance, one authority will tell you that the old time "tentative" method of development —that is, relying solely upon the eye and experience in judging the proper density of a negative—is the only correct way, and that by diluting the developer, using bromide and by various other manipulations, the densities and gradations of under and over exposed plates may be modified at will, and he can offer almost indisputable evidence, both in theory and in practice, to prove the correctness of his reasoning. Another authority will tell you that relative gradations are determined wholly by exposure and that "factorial" development, that is, multiplying the time of first appearance of the image by a certain factor with a given developer and for a given subject, is the only sure way of invariably producing negatives of proper printing gradations, regardless of difference in density, and within certain limits there can be no doubt that he too is right. Still another will prove to you that, after exhaustive and scientifically determined experiments, it has been shown that "time and temperature" development is the photographer's only salvation if he wants to get the best negative that any plate will yield, whether it be given a normal exposure or be under or over-timed. While within the past year or two "tank" development has had a great vogue and seems destined, with a large proportion of photographers at least, to become the most popular, notwithstanding the objections by the advocates of the other methods that, as a considerable number of plates are developed at one time, and temperatures when development is prolonged are not constant, there is little opportunity offered to vary the time of development for different subjects and so regulate contrasts as may be required.

Of course I have my own convictions, and I may as well confess that I unhesitatingly believe in the time and temperature method, but for whatever value it may be I have compiled and give herewith a digest of some max-

If an over exposed plate is allowed to remain in the developer longer than 60 seconds, it cannot be saved from flatness. It must be removed to cold water at once while preparing hard working developer, or development may be stopped and negative intensified.

Do not use old developer on under exposed plates, as it acts like bromide and produces greater contrasts.

Harsh contrasts may be over developed and reduced with ammonium persulphate.

With slow acting developers, such as hydrochinone, the effect of bromide is exhausted before the image appears, and it is therefore of no avail. Quick acting developers, such as metol, are more sensitive to bromide.

Exposed films (and paper) will seem under exposed if not developed at once, particularly if they have been subjected to a warm or damp atmosphere.

Wetting negatives before development has a tendency to produce airbells. Therefore, when using backed plates, do not wash the backing off until development is well started.

Some writers claim that rapid development produces finer grained negatives, while others say that tank development gives finer grain.

When the developer is diluted the bulk for each plate should be proportionately increased.

Taking plate from developer and exposing it to the atmosphere will cause the developer adhering to it to oxidize and turn yellow. This will also result from exposure to the air during fixation, but an acid bath will prevent this by clearing the stain from the film.

Hard water should never be used in making up solutions.

Use a very dilute developer without bromide in developing double coated plates to allow the developer to penetrate the film fully.

When a plate is developed a given length of time, the greater the quantity of alkali used the more rapid the reduction, and consequently the greater the contrast.

Use less alkali in summer, as it may cause fog.

To prevent pinholes, plates should

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ims (if I may so call them) relating to values theories and methods, some of these maxims being the result of my own experience, while others are drawn from sources too numerous or too general to permit me here to make specific acknowledgments.

In the main, and when considered in connection with the particular theory or method of development to which any given suggestion may specially apply, in those cases where they are not equally applicable to all methods, I think their principles will be found correct, although, being an advocate of time development, I cannot in some instances give them my own full endorsement. Many—perhaps most—of these maxims are well known to photographers of considerable experience, and to such I can but suggest that the only service this digest may be will be to have them succinctly brought together as a means of ready reference; while to those who are less experienced, perhaps they may provide some food for observation and reflection which might not otherwise be obtained without much reading and practice. In any event, however, I have presumed that the reader has some knowledge of photography and is more or less acquainted with the various processes connected therewith, as well as with the terms I have used, as there is not the space here to do more than generalize. Besides to do otherwise would defeat my purpose in getting together very briefly a few helpful hints on the subject of development. In fact, for the sake of brevity, the suggestions may not always be given in a connected and logical way. In certain instances, also, some of these statements may even seem contradictory, but as they each have their adherents, with their arguments in their support, they may for that reason prove the more valuable as a stimulus for independent thought and observation. Other suggestions are simply with respect to matters of good practice, without reference to any particular theory or method of development. I have given them just as they occur in my note book. Fuller particulars regarding formulæ and processes referred to may readily be found in current photographic text and reference books. J. W. L.

either be dusted before placing in the developer or gone over with a tuft of cotton immediately after being placed in the developer.

When examining plates during development, turn the film side toward the lamp to prevent fog.

Too warm developers produce softness and even flatness, due partly to fog and partly to a swelling and running together of the minute cells containing the deposit of silver.

To prevent frilling and reticulation in hot weather, use strong developer, fix, slightly wash and dry, then re-wash. Or, to prevent frilling, treat the edges of the plate with India rubber and benzole solution, or with paraffine.

When developing in warm weather, the gelatine of the plate may be rendered insoluble by the use of a dilute solution of formaline or chrome alum before development.

Developers made of boiled water have better keeping qualities.

When the use of warm water in development cannot be avoided, use sufficient bromide in the developer to restrain development long enough to prevent fog.

There is a limit to the rule that long development produces greater contrast, as when the highest lights have reached their maximum density, the half tones will continue to build up and tend to equalize and flatten the negative. This is particularly so with over exposures. Prolonged development may also flatten the negative by producing fog.

If the plate tends toward flatness, develop a little longer. If contrasty, keep thin.

It is better not to attempt local control in development, leaving any changes in densities to be accomplished later and in daylight, by other methods.

Chloride of sodium (common salt) may be substituted for bromide of potash as a restrainer, using it in a 10 per cent. solution, and using but half the amount that would be used of bromide.

If bromide is used after development has commenced, to correct exposure, use a much larger quantity. Plate may be soaked in a 10 per cent. solution and returned to developer.

If alkali is decreased to hold back detail, it will only do so for a time and must be done before developer is poured on plate.

More carbonate of soda may be used with dilute developer than with strong developer, and bromide used to prevent fog if development is prolonged.

Ordinary exposures, say ranging from one to four, may all be developed together, with same result as to negative.

To develop locally, use a weak developer and bring up contrasts with strong developer, using a wad of cotton and keeping the plate under the developer to prevent lines of demarcation. This may also be done in local reduction, or intensification, i. e., plate kept under water while using reducing or intensifying solution.

Where foreground and sky are on one plate, the plate may be put in a dilute developer and the foreground intensified by using a tuft of cotton and strong developer, restraining the sky with bromide.

Local development may be done by touching the plate with the warm end of the finger or by blowing air through a long stemmed clay pipe, the bowl of which has been heated.

Use a more dilute developer, and perhaps some bromide to prevent fog, when developing portrait with white draperies.

Local development may be done by blotting off the developer and then applying it locally to the thin parts with a camel's hair brush. The same method may be used in applying bromide.

To ascertain the grains of pyro per ounce of developer, take total quantity

of water in pyro solution, add to this relative proportion of alkali and water solution required to make full quantity that one ounce of pyro will make, then divide this into total grains of pyro.

Use of too much pyro to proportion of alkali will produce thin negative as it has a restraining effect. The pyro and alkali must be in proper proportions.

By making pyro, bromide and other chemicals in 10 per cent. solutions, every 10 minims will contain one grain of the pyro, etc.

In using very dilute solutions of pyro, more sulphite of soda should be used to insure freedom from stain resulting from the longer time required in development.

Sulphite, etc., preserves pyro by reason of the fact that it is more greedy of oxygen than pyro.

When negatives are developed in pyro and cleared in an acid bath, the development should be carried somewhat farther than when they are left stained with the pyro which gives them greater printing capacity.

Pyro produces finely grained negatives. More sulphite also gives finer grain.

Pyro will not stain the hands so much if they are kept free from hypo. Stains may be removed from the hands by using a strong solution of chloride of lime and afterward soaking them in hypo solution, by using a weak solution of muriatic acid, by rubbing the fingers with a paste made by adding water to ammonium bisulphate and then rinsing, by rubbing them with ammonium persulphate crystals or with lemon juice. Washing the fingers in sweet milk previous to placing them in the developer will prevent stains to a certain extent.

Citric acid should be used as a preservative with amidol developer.

For metol poisoning use zinc ointment. Rubbing the hands with vaseline beforehand will prevent poisoning.

To secure flat negatives, use metol and do not carry development too far.

The speed numbers of plates are slightly higher when developed with metol than when pyro is used. Therefore metol is very suitable for under exposures.

In order to get the benefit of contrasts with hydrochinone, do not develop too long, as otherwise shadows will begin to build up and equalize.

Hydrochinone will not work well at low temperatures.

Very harsh negatives, due to under exposure, may often be made less contrasty by two or three seconds' exposure to a candle or match held at a distance of two to three feet.

The greater the contrasts in a subject, as a child wearing a white dress and posed against a dark background, the thinner must the negative be kept in development.

In landscape photography, do not carry development so far that the sky will be perfectly opaque, as it may produce false gradations in the remaining portion of the picture. For sea views, use double the quantity of pyro but less water and add some bromide at commencement, restraining sky with bromide if necessary. If in the evening, or the view contains ships or foreground, use less pyro.

For developing snow scenes, use half strength developer when it is desired to bring out detail in contrasty subject, then finish with full strength developer, which may or may not contain bromide. In this case the negative should be kept thin. One excellent authority, however, recommends a generous exposure and a hard working developer, with plenty of bromide. If a snow scene is flat and

lacks contrast it may be slightly under exposed and developed with hydrochinone or some other contrast—giving developer.

It is well to use a rather warm developer with snow scenes containing dark objects, to prevent great contrasts.

Hoar frost scenes should be developed very hard to secure contrast, but it should be done in weak developer to get detail.

Night scenes should be developed in dilute solution and kept thin.

For developing shadows in Rembrandt lightings, throw developer in one end of tray and paint over with brush dipped in alkali (without sulphite) and flow back at once to prevent fog.

Use dilute developer for clouds, except when ortho plates are used, when it may be normal.

Always develop ortho plates full time, although they should not be over developed as they clog up rapidly. Two or three drops of bromide should usually be added to each five or six ounces of pyro developer. Pyro is recommended for ortho plates, although metol is also good.

A plate should not remain in normal developer for more than ten minutes, or fog may set in. When the plate has once commenced to fog, no further density can be obtained but contrasts are likely to be reduced.

An excess of sulphite will produce fog. Fog may also be caused by over exposure.

If under exposures are likely to fog on account of prolonged development, secure density by finishing with a stronger developer.

It is claimed that too much developer will cause fog. The negative will also be less vigorous on account of less bromide getting into it from the reduced plate.

A small quantity of bromide does not hold back shadows but gives better detail by preventing fog.

Decomposed pyro will cause fog.

Fog is always likely to occur when temperature of developer is greater than 65 to 70 degrees.

Use a longer factor, in time development, for landscapes than for interiors, and longer for interiors than for portraits. Say for landscapes 1, interiors ¾, portraits 3/5.

For varying exposures, use the factorial method and develop all together for same length of time the correct exposure is developed.

Variations in the amount of alkali do not alter the factor with any developer.

If plates are known to be over exposed, add to each ounce of pyro developer, before development, two or more drops of 10 per cent. bromide solution and develop for a length of time equal to that which it would take to develop a normal exposure by the factorial system, plus the time it takes for the image to appear in the developer containing bromide.

For ascertaining multiplying factor, where there is no sky or brilliant highlight, consider three-fifths of time of appearance of image as time for multiplying by factor. For snow pictures, use two-thirds.

In factorial development, any specially over exposed highlight, such as the window of an interior, should be neglected in determining the time of first appearance of image.

As there is very little difference in the time of first appearance of high lights between a normal and an over exposed plate, great care must be given to the determination of the exact time of first appearance. The shadows in an over exposure will of course appear much more quickly than in a normal exposure.

As bromide does not alter the multiplying factor with long factor developers, like metol, they may be used several times until exhausted and after they have taken up from the plate a considerable quantity of bromide.

Time and temperature development is best for double coated plates, which cannot be judged from the back, owing to thickness of film. Use double the quantity of water and time accordingly.

Tank development is very suitable for double coated plates.

In development of films, if they show a tendency to curl, or cannot be kept covered in developer, fasten them to plates by using rubber bands at the ends.

If kept in bottles, away from the air, hypo in solution will keep for some time except in very warm weather, but it should be discarded when it becomes discolored or works too slowly.

A very strong hypo bath will fix more slowly than a somewhat weaker one.

A pint of four to one hypo will fix about twenty-five 5x7 plates.

Hypo acidifies in solution when exposed to the air and should be neutralized with ammonia or bicarbonate of soda to prevent yellow stains.

An old solution of fixing bath will soften the film.

Leave plate in fixing bath after milky appearance is gone for as long a time as it required to produce this effect.

If hypo in bottom of fixing bath is not thoroughly dissolved it may cause frilling or leathery film on account of being too strong. Insufficient rinsing before fixing may also cause leathery film.

Fixing baths after exhausted may appear to be working well but are unsafe as the silver is not completely removed from the film.

In an emergency, a solution of sodium sulphite may be used instead of hypo.

Do not remove plates from hypo and return after exposure, or allow plates to stand after being fixed without washing, or reduction will result.

Light falling on plates in fixing bath is injurious unless the developer has been thoroughly washed therefrom.

A plate should be rocked occasionally to insure thorough fixation.

Hypo much colored with pyro should not be used as it will stain the negatives and cause them to print flat.

Plates should be placed in formaline (one to twenty) after development and good rinsing, and allowed to remain three or four minutes, in hot weather, before fixing.

An acid fixing bath prevents stain by neutralizing the alkali left in the plate from the developer. The pyro, being left in its original state, cannot oxidize; this also prevents discoloration of the acid bath.

An acid bath will remain clear until its fixing strength is completely exhausted, while a plain bath becomes discolored before one-tenth of its fixing strength has been used.

Alum cannot be added to a plain fixing bath, as it causes turbidity.

An acid fixing bath will fix only half as many plates as a plain bath of the same strength. If it contains chrome alum it will fix about three-fourths as many plates as a plain bath of the same strength.

When an acid bath is used, plates should be well rinsed after development to avoid neutralizing the bath.

An acid bath cannot be restored by adding more hypo.

Always shake and filter an acid fixing bath before using, to prevent spots on plates.

An acid-alum bath is generally best in hot weather. It may be kept cool by placing it in a vessel containing ice.

Hypo must be thoroughly removed from the plates before applying an alum clearing and hardening bath.

It is difficult to remove pyro stain from negatives by an alum bath after the negative has once been allowed to dry.

Formaline must never be used until hypo is well eliminated from plate.

Flexible films should not be allowed to stick together in fixing but should be moved occasionally to prevent them from fixing unevenly.

Plates require less washing in hot weather.

Negatives left too long in water become yellow.

To wash flexible films in a washing box, put two back to back with a sheet of glass between them.

Roll films may be washed by fastening corks on one side and lead on the other and allowing them to float in a bath tub full of water. Or they may be fastened to a board with pins at each end and floated face down.

Negatives should be carefully rinsed and gone over with cotton before drying, to remove particles of dust which would show in the print, and also to prevent grittiness in retouching.

Water should not be allowed to collect in spots when drying, as it may produce deposits of lime, which will cause trouble if negatives are to be intensified afterward.

Do not place negatives near the floor or upholstered or dusty furniture to dry, or dust will settle and cause pinholes. Drying racks are best, provided sufficient space is left between plates, as they raise the negative at some distance from the table or other support.

A negative should not require over two hours in drying, to secure the best results.

If a negative is to be dried by the use of alcohol, the surplus water should first be removed with a piece of lintless cloth.

Pure alcohol is better for quick drying. If wood alcohol is substituted, use carbonate of soda to absorb the water therefrom; then filter.

When drying with alcohol, plates must be well fixed and washed, and trays must be clean, to avoid spottiness and stains.

Special care must be used to prevent dust from adhering to plates when dried in alcohol. A good plan is to place them in a drying rack and cover it over with cheese cloth.

A ruby light is not so safe after the glass has been in use for some time.

A dark room lamp will not give a brilliant light unless the room is well ventilated.

Headaches in the dark room are more likely to be caused by poor ventilation than by the red light. Ruby light is less hurtful to the eyes when combined with yellow.

A water bag is often useful in the dark room for heating or cooling trays in development, by supporting the trays by the bag.

To dust plates, use a silk handkerchief instead of a brush, to prevent electrical action, causing dust to adhere. A better way to free them from dust is to turn the plates film side down and tap gently with the fingers on the glass side.

A wire window screen makes an excellent support across the bath tub when developing plates at home, as it allows surplus developer and water to pass through into the tub.

FROM THE VERY BEGINNING.

An Elementary Manual in Three Parts.

BY C. H. CLAUDY.

Part I.

NOT long ago I had the pleasure of meeting your editor in his sanctum. While there a visitor dropped in and made a strong plea for more material for the beginner. The visitor sold magazines, among other things. "What we want," he said, "what we have a call for, is a magazine that we can sell when we sell a camera, and tell the buyer that in it he will find out something of benefit to him, a beginner,—something not complicated, not technical, not hard to understand.

Your editor turned to his desk and fished out half a dozen letters. He read extracts. "Give us something simple." "Please run some stories for a rank outsider in the game." "I want to know how to work my little five dollar camera so I will get something half as good as the agent's samples," etc., etc.

Your editor turned to me. "Claudy," he said, "there is the demand. See if you can come down to earth long enough to write me and the PHOTOGRAPHIC TIMES a short series which will tell the beginner something he ought to know. Leave out the technicalities. When you say "focus, f6.8, factorial development, circle of diffusion, conjugate foci, etc., explain what you mean. Better yet, don't use those terms. Tell them how to use a simple camera in a simple way. Imagine you didn't know the business end of a camera and wanted to learn, and write so you would learn."

This series then is my endeavor to fill the bill. And if any one says it is too simple or childish, let him blame the editor and the correspondents who have asked for simple and easily understood talks about the subject.

To begin. A camera, of any kind, is nothing more or less than a little chamber from which all light can be excluded. The only light ever admitted comes through one or more pieces of glass called the lens. There is a means for letting in the light and keeping it out of the lens and the dark little chamber, called a shutter. At the opposite end of the camera from the lens is some means for holding a piece of sensitive material—material sensitive in a chemical way to the action of light. When you expose your skin to bright sunlight for any length of time, it first burns red, then tans. Sunlight turns green apples red. Sunlight, too much of it, turns green grass brown. All this is chemical action due to the action of sunlight. The sensitive material in the camera is a million times and more, sensitive to light than skin or fruit. It is so sensitive that the least touch of white sunlight—even for a tiny fraction of a second, affects it. The effect does not show to the eye, but is made visible when the sensitive material is submitted to the action of certain chemicals, of which more later.

The sensitive material is in one of two forms. It is either coated upon glass, when it is called a dry plate—or it is coated upon celluloid, when it is called film. There is always a hot discussion going on as to which is the better to use, films or plates, but for the beginner,—the man who wants his camera for

recreation only, in its simplest form, the films have the most recommendations.

These are as follows; they are very light. A lot can be carried in the pocket. They can be put into the camera in daylight. Plates must be loaded into special pieces of apparatus, called plate holders, in a dark room, with only a weak red light to see by. Roll films—films put up in a roll, as distinguished from those put up flat, when they are called film packs,—can be developed—that is, treated with chemicals so that the action of the light through the lens becomes visible,—in what is known as a tank, or a developing machine, — an operation which is mechanical and automatic, and requires only the following of instructions to get just as good results as the expert can. Plates, while they can also be developed in a tank or a machine, must be taken out of the plate holders and put in the tank or machine in the dark room before referred to. There are other advantages and disadvantages, but these will suffice.

Now the first thing to do is to buy the camera. You will go to a supply store and will be shown a bewildering array of cameras, all of which will look about alike, but which will vary greatly as to price. You will see a library of catalogues, telling you about at least a hundred different kinds of cameras, at a hundred prices from one dollar to three hundred. After you have looked a little you will distinguish two broad divisions in the smaller or hand cameras. One kind looks like a black box with a few holes in it—the other opens and shows shining metal work, a lens, a red leather bellows, a rubber tube and so on. These are the more expensive kinds. If you are wise you will buy a cheap film camera, of the box type, and technically known as "fixed focus." This means that the lens is stationary with relation to the film or plate. "Variable focus" instruments provide an adjustment by which the distance from lens to plate can be varied. As there are a great many little things to learn all at once about making a picture, the less complications you have at the outset, the quicker you will learn. As this varying the distance between lens and plate, called focussing, is a somewhat large subject, and as the fixed focus camera avoids it, by all means get a fixed focus camera to begin with.

For scientific and impossible-to-get-over reasons, all fixed focus cameras have comparatively small sized plates or films. They are rarely four by five inches, more commonly three and one half by three and one half, which is a good size to begin with. The smaller size has the added advantage of making the supplies—the rolls of films,—cost less. They cost from five to ten dollars—the cameras,—and the films, in rolls of six exposures each—containing material for six pictures—cost thirty cents each.

Buy your fixed focus box camera and a roll of film and take it home. Sit down at your leisure and examine the thing carefully. In front in the center is a hole. Behind something in this hole is the lens. The something is the shutter. Not knowing the particular variety you have bought I cannot tell you exactly how to operate your shutter, but it is probably by means of a little projecting lever on top or at the side of the camera. Find out from the instruction book, and work it. Work it a lot. See just how much muscular force you need to press it to make the shutter wink back and forth across the lens. Practice doing it with the camera held about in the pit of your stomach by the left hand, and try to hold it steady. It is very essential for the success of any picture taken when

the camera is held in the hand, that it, the camera, be held steadily and with as little jar and shake as possible.

The next thing to learn is how to put the roll of film into the camera. Right here spend your thirty cents and spoil a roll of film to know just how it is made. First break the seal of paper which surrounds it. Then unwind it completely. This unwinding will utterly ruin the film for picture purposes, but it will save some future exposures by your knowing what it is like. You will note that the film,—a milky yellowish strip of celluloid, is shiny on one side, and dull on the other. The shiny side is next the protecting strip of black paper which extends beyond it on either end. You will note that only the first end is fastened down and that the last end is loose, but provided with a paster ready to fasten. You will note numbers in white on the back of the film, and before the first of these is a little white hand. Now roll up the film again and insert in the camera according to the directions, for the particular style of instrument you have. As you know that when unrolled the spool presents a film on one side and a strip of black paper on the other, and you presumably have guessed that it is the film and not the paper on which the picture is made, you can appreciate the importance of getting the spool into the camera right side up, or so that the film will be turned inwards and towards the lens.

Practice putting the film in, winding it through, watching the little numbers through the tiny ruby window you will find in the rear of your camera, until you are thoroughly familiar with the whole operation, and know just how the numbers look through the red glass. The purpose of these numbers is to tell you how far to wind the film between each picture. After one picture is made, another picture must not be made on that same strip of film, otherwise there would be what is called a double exposure, and the result would be only blur and confusion. So the film is wound off its original spool on to the other, or take up spool, and the amount of winding to be done is shown by the periodical appearance of the little white numbers opposite the little ruby window. Also, they indicate the number of pictures already made and consequently the number which can yet be made upon the spool of film.

After the film is completely used, and the last number has wound past the window keep on turning the key until it will turn no more, or until enough turns have been made to insure all the black paper having been wound off the original spool and onto the take-up spool. Then, and not till then,—except in these trials,—remove the back of the camera, or open the door, or whatever it is you do on your particular camera to get to the spools, and take out the wound-up film. Clinging to the wooden shaft of the original spool you will find a piece of gummed paper. Use this to stick the black flap of the roll to itself, so it will not unwind, and put the whole away from the light—in a pocket or box.

Now I want to make it exceedingly emphatic, and must repeat this for the sake of emphasis,—roll film in common with other sensitive photographic products, will not stand light. If the tiny flash of light in your camera, made through the little lens by snapping the marvelously quick shutter mechanism back and forth, is enough to make a picture, you can realize that the same amount in the wrong place will spoil it. You must not put your films in the camera in bright sunlight—get in the shade—in a house is better. You must not let spools of film, exposed or fresh, lie around uncovered. Roll film is carefully made and well pro-

tected against ordinary handling, but it isn't fool-proof and light has a way of leaking and seeping in and around where it is least expected. If you are careful in loading and unloading—if you take care and give the film a chance, there is no reason why you shouldn't make just as good pictures within the capabilities of your instrument as any one else with larger and finer machines. All too often the beginner blames the film, the camera the man who does the developing and printing,—everything, but himself, when it is only and solely his own fault for failing to mind the simple rules which the nature of the things require, or attempting to do some photographic impossibility as making snap shots indoors with the little box camera, or what is called a time exposure, by holding the camera in the hand.

The beginner,—any owner of a small box camera, should remember that while his instrument may be the very best of its kind, it is not suited for all kinds of photographic work. Any one who took a target pistol to hunt elephants with would be considered a fool. The man who attempted to paint a house with a brush used by miniature painters would be an idiot, and in the same way, the man who tries to do speed work with a fixed focus camera, or to get artistically broad effects in portrait lighting without a proper equipment, is inclined to the foolish side of life. Within its capabilities, the box camera is an admirable instrument and is par excellance the camera to learn with—but it won't do everything in photography any more than one swallow will make a summer.

The rules are very simple, and not at all exacting in the matter of difficulty, but a breaking of them means no pictures. For this reason I am making it as strong as I know how—waste a roll of film to find out what it is like—learn all you can about using your camera before you make pictures—keep your films from the light in loading and unloading and remember that the directions given here and with the camera are not written because those who write like to have fun with you, but because they want you to take good pictures. It is of financial interest to the manufacturer to have you do well,—it is of all kinds of interest to the editor and to me to have his magazine read and appreciated. Therefore, you will do well, until you are photographically grown up, to follow literally the rules here laid down, and incorporated in your book of instructions, whether you believe in the necessity of them or not.

Your dealer can tell you a hundred stories of men and women who take a picture and immediately open the camera, expecting a mounted print to drop out, and who are resentful when told they have ruined their film. I saw a man bring in a loosely wrapped package of newspaper once and pass it across the counter to the dealer with the request to "make this into pictures. I have been very careful to keep it from the light." "This" was a mass of unrolled film "protected from the light" by a fold of newspaper. The man didn't know—hadn't read his little book,—was trying to do without knowing how.

Don't *you* be like him. Be able to blame some one, if things go wrong and you know you have followed instructions. Next paper we will take some pictures and see what problems we can conquer by the way. Picture taking sounds a lot more difficult in the telling than it is in the doing,—yet one can go as far as one wills, and never reach the end of the path of photographic knowledge.

Editorial Notes

Au Revoir Todd—and the Photo Beacon, so announces F. Dundas, in his June issue. We hate to lose Todd and the Beacon, yet if Todd leaves the helm of the Beacon, it is better that the Beacon be absorbed or swallowed up by the new and mighty combination. The individuality of Todd has been so impressed upon his publication, that edited by other hands (to borrow a Mexican simile) it would be like an egg without salt. In photographic journalism Todd has been the Elbert Hubbard, Edward W. Bok and Horace Greely. We have laughed with him and at him, sometimes agreed, and many times disagreed with him, but always have we been impressed by the sterling straightforward honesty of the man, and his singleness of purpose in being of benefit to the American Photographer.

* * * *

There is a great deal in keeping up to date. There are many amateur photographers, and good ones too, who having arrived at a certain stage of proficiency feel themselves competent to work out their own salvation, in any photographic problem that may come up. They understand how to make fairly accurate exposures, how to develop, and are probably quite expert in working their favorite printing medium. This is the class who exclaim, "No I never read the photographic journals, nothing new in them, same old things over and over again." To a certain extent the photographic journals must treat of old and familiar subjects. Many times a suggested method for accomplishing some special results is not so good, or effective as your own. On the other hand, is there not an equal possibility of some better method being discovered and told of? Also there are new processes and new goods. These are told of in the photographic journals. We know of one man who, though an advocate of time development, did not know that the kodak tank had been brought out to supersede the developing machine, till the tank had been on the market a year. Read the photographic journals, if you are an expert you may pass by the articles rudimentary in nature, but somewhere between the covers will be discovered something of sufficient value to make it well worth your while. Read them, even if you feel yourself sufficiently well posted for all your needs.

* * * *

When the blue days come and everything seems to go wrong and you just about make up your mind to give up attempting to make pictures—then you are nearest success. But to reach this rather fickle Goddess, you must make the one new attempt, and if you *do* make this attempt, you will be successful, just because you are in a mood savage enough to really get to the bottom of your troubles, and find the remedy. Most of our picture troubles come from carelessness, little things overlooked. Many of these little things are but trifles in themselves, but in the aggregate form quite a barrier to success. Next blue day, get just as savage, and disgusted, as you can—then go to work.

* * * *

It frequently happens that the amateur with his ever ready hand camera has the

opportunity of making a photograph or series of photographs of great news value to the local or metropolitan dailies, if used at once. Such things as disastrous fires, train wrecks, or unusual happenings of a more pleasant nature are always "news" and when illustrations can be had, add much to the value of the story. If by chance you have the opportunity of making negatives of this character and wish a market for them, don't sit down and write a polite little note inquiring, if they can use prints. Wire "Am sending photos of such and such event," then get very busy and make solios and send them off by the first mail. Send prints to half a dozen papers in as many nearby cities, or further if the event warrants it. You may trust the papers to do the right thing by you. Only send prints to one paper in a city,—tell them the prints are exclusive for their city—write on the back of each print the full description, together with your name and address. It is proper to enclose a bill, but the newspaper idea as to value may be all out of proportion to yours, and if you leave it to them, your remuneration may be much greater. If you know you have the only negatives of some very important event, in such case you should invite offers by wire, but have your prints ready the first possible moment. Opportunities of this nature come but seldom, and when they do come, make the most of them.

MONTHLY FOREIGN DIGEST.

TRANSLATED BY HENRY F. RAESS.

Direct Positives of Medals.

According to Demole, direct positives can be obtained from medals or coins by placing the object between two sheets of damp glossy white paper and the latter placed between two sheets of felt and placed for some time under pressure in a copying press. If these matrices are lighted from the side and photographed on negative paper, a direct positive print will be obtained. This method is used by the Geneva (Swiss) numismatic Society.--*Photographische Industrie*, Vol. 36, Sept. '06.

The Preservation of Diamidophenol Developer by A. and L. Lumière and A. Seyewetz.

The remarkable developing properties of diamidophenol (Amidol) in the absence of alkali and the ease with which a solution ready for use may be prepared are well known. In spite, however, of these advantages, the developer is not used to the extent that one might think because of its poor keeping qualities when in solution. In the following experiments the authors have endeavored to ascertain the cause of this trouble and its remedy. Up to the present time it was thought that the principal cause of this deterioration was due to the ease with which dilute solutions of sodium sulphite absorbed oxygen from the air. In fact one can predict that in a developer in which sodium sulphite plays the role of an alkali, will lose its developing power the moment the alkali-acting body loses its oxygen absorbing property. One can further gauge the reduction of developing properties by the continued darkening of the solution, first yellow, then brown and finally red, all due to the destruction of the sulphite. We have recognized that this generally accepted hypothesis is not correct, and that the changes in the solution are not due to the destruction of the sulphite, but to the oxidation of the diamidophenol. The

presence of sodium sulphite hindering, but not preventing, this oxidation. In proof of this we mention the results of an analysis of a normal developer which contained 0.5% of diamidophenol and 3% of anhydrous sodium sulphite. After the solution had become red and lost its developing power, we found that it still contained 75% of the original sulphite, an amount which is sufficient to give a freshly prepared diamidophenol solution, the proper developing power. On the other hand, if we add some more sulphite to a solution which has lost its developing properties, its reducing power is only slightly increased, but if we add an amount of diamidophenol equal to the original, it will again have the same developing power. This proves that the loss of developing power is due to the oxidation of the diamidophenol. In order to ascertain if this destruction was due to the absorption of oxygen from the air, we filled a bottle with a normal developer, corked well and paraffined, and after one year, the solution possessed only a slight yellow color and had lost practically none of its developing properties. The rapid oxidation of a developer in an open bottle can be retarded if the solution is covered with a layer of petroleum. As sodium sulphite retards the oxidation of diamidophenol, we made thirteen tests in which the amount of sulphite varied from zero to 25%. The solutions were placed in open bottles and kept at the same temperature. It was found that up to 3% the solutions colored less rapidly according, as they contained less amounts of sulphite. In the case of the 25% solution the color was much deeper than any of the others, the color being stronger at the top of the liquid showing that the absorption of oxygen took place at the surface. These tests prove conclusively that the changes in the diamidophenol developer are not due to the oxidation of the sulphite, as increasing amounts would have preserved the developer for longer periods, whereas in fact it hastened the oxidation of the diamidophenol. We then made a solution containing 4% diamidophenol and 25% anhydrous sodium sulphite; under these conditions the developer darkened quicker even in well corked bottles than a normal developer under similar conditions. To sum up, we find.

1st. The change in the diamidophenol developer is not due to the oxidation of the sodium sulphite, as the latter is less rapidly oxidized in the presence of diamidophenol than when in a simple aqueous solution.

2d. An excessive amount of sulphite does not retard the oxidation of the diamidophenol, it in fact accelerates the action.

3rd. Saturated solutions of diamidophenol and sodium sulphite when mixed, oxidize more rapidly than when of normal strength, even if kept in well stoppered bottles.

4th. A normal developer consisting of 0.5% diamidophenol (Amidol) and 3% anhydrous sodium sulphite will keep for a long time in well stoppered bottles.

—*Der Amateur,* Vol. 3, No. 9, Sept., '06.

Restoring Faded Negatives.

Crookes and Roberts have worked out a method for restoring yellow or faded negatives. The plates are placed for fifteen minutes in the following pyro developer.

English.		Metric.
33 ozs.	Water	1000. c.c.
90 grs	Potassium Metabisulphite	6.0
105 grs.	Sodium Sulphite	7.0
90 grs.	Sodium Carbonate	6.0
90 grs.	Pyro	6.0

After this the plates are washed and then placed in a fresh 15% fixing solution, again washed and finally placed in a gold sulphocyanide toning bath. By this treatment fine details which had become invisible were restored.—*Photographische Industrie,* Vol. 36, Sept. '06.

WHAT IS THE BEST LENS FOR ENLARGING?

BY "EDELWEISS."

THE enlarging process is to-day the recognized method amongst amateur photographers for obtaining big pictures; most often it is direct enlarging on to bromide paper, less frequently it is making enlarged negatives to be printed by one of the contact methods, but in each case some form of enlarger has to be used, and that enlarger must have a lens. The question is—what is the best for the purpose? and when I say "the best," I mean the price of that lens to be considered as one of the qualities to be called into the account.

If price is ignored, the question can be answered in a very few words. In enlarging, we are photographing from one flat surface—the negative or transparency—on to another flat surface, the easel or plate. A modern flat-field anastigmat is indicated as the best lens to use under such conditions, and, except for its price, it is what every photographer would feel tempted to employ. With the best negatives and the best form of enlarger, the best anastigmat lens would be the tool to use; but I want to point out in this article that when the negatives are not the best, and when the enlarger suffers from certain faults from which enlargers do suffer, the costly anastigmat may not give as good a result as a much poorer quality of lens, while in most cases, good or bad, there is no real need for a modern flat-field lens, even when the best possible result is wanted, as the poorer lens stopped down well will answer just as well.

Let us in the first place take the case of a negative obtained with a single lens, with the stop of the lens between the glass and the subject. This is the kind of single lens most often found in the cheaper hand camera. Such a lens bends straight lines when they fall near the edges of the plate, giving what is called "barrel shaped distortion." If the same lens were used in the enlarger, taking care that the stop was between the glass of the lens and the easel, the lens would once more distort the picture, but this time it would tend to bend the lines straight again. It would not absolutely correct them, except under certain conditions with which I need not deal, but it would under ordinary circumstances so far correct them that the distortion was no longer noticeable. This is a case where the defective single lens would actually give a better enlargement than the more perfect and more expensive one.

There are other circumstances under which the same would hold good. Many poor lenses give very uneven illumination of the plate, the lighting falling off rapidly as the edges are approached. This shows itself in the negative by the edges being comparatively thin while the centre is fully dense. If such a negative is put in an enlarger with a lens that has the same fault, to some extent the extra transparency of the edges of the negative is counterbalanced by the lens, and the resulting enlargement is more evenly exposed than it would have been had a more perfect lens been used in the enlarger. In this case, though, this only holds good when enlarging direct from the negative. If a transparency is being used, its edges will be denser than its centre, because the edges of the negative from which it was made were thinner, and the use of the same lens in the enlarger will exaggerate the defect.

These two classes of defects have been referred to here because they are often mentioned in articles on enlarging, and because I wish my readers to understand when they read such articles what those defects are, and how it is supposed they may be minimized by the use in the enlarger of the same lens as was employed to take the original negatives. But if my own opinion is wanted—and this article is written to give it, and the facts on which it is based—it is that these advantages exist more on paper than in practice. Single lenses are less and less used in the production of small negatives, and bad cases of barrel-shaped distortion are certainly not common. The only class of subject where they would be likely to give trouble is architecture, and the architectural photographer is of all photographers the man who is least likely to use a single lens. Then, again, in the other case of uneven illumination. The whole of the tendency of modern lens manufacture is towards the making of a lens which covers a very wide angle, which will, in fact, as far as illumination goes, cover a much larger plate than that with which it is to be used. The result is the bellows of the camera are strongly lit; this light is reflected on to the plate, and particularly on to its edges, and it is now more often the case, from this cause, that the edges of the negative are actually denser rather than thinner than the centre. So that these advantages when using in enlarging the same lens as was used to take the original negative are not so very great, after all. The one thing which will make such a course advantageous is that only one lens has to be bought. That to most of us is a very real benefit; and to my mind that constitutes the great merit of the system.

So far as I am aware there is no drawback or inconvenience that follows from using the same lens on enlarger and camera, except that the lens has to be changed from one apparatus to another as required. Even this vanishes when the photographer uses his camera with the lens on it for daylight enlarging, as so many do. If the lens will cover the plate in the first instance when the negative is being taken, it will do so when that same negative is to be enlarged, however great may be the degree of enlargement. It will, almost to a certainty, want stopping down, but when stopped down it will do all that is wanted; and, as a rule, stopping down in enlarging, so far from being an inconvenience, is desirable, in order to bring the exposure within controllable limits, especially in daylight work.

But, perhaps, this answer to the question at the head of this article is not what the photographer wants. He has an enlarger, or is going to get an enlarger, and would like to know what lens he should have fitted to it. He is willing to buy a lens for the purpose, but it should not be too expensive. What lens is it to be? In such a case, my own choice most certainly be a rapid rectilinear, not a rapid rectilinear made just to cover the size of the plate that is to be used, but one a size or two larger. A seven inch half-plate R. R. lens that has seen many years' service figures on my own enlarger, which is only intended to take quarter-plates. The advantage of the half-plate lens is that it will work with the most perfect definition over the whole of a quarter-plate with full aperture, f/.8. This means that the picture is perfectly illuminated, exposures are reduced when very dense negatives are to be dealt with, and there is no risk of the meshes of the mantle showing on the enlargement, always a possibility when enlarging by incandescent gas with a lens with a small stop.

Many enlarging lanterns are fitted with

portrait lenses, or with some similar form. These may be satisfactory for showing slides, where as a rule so much store is not set on critical definition; but for enlarging purposes the R. R. will be found to be distinctly superior. Stopped down to f/8 the portrait lens will not give as good definition all over the plate for which it is made as the longer focus R. R. lens will do, while the portrait lens will cost more and be decidedly heavier and more cumbrous.

Daylight enlarging is most often done with a fixed focus camera. In this a single spectacle lens with a very small stop is usually fitted. Those who are constructing a fixed focus enlarger will find a spectacle lens costing three of four pence will be all they want, but it must be well stopped down. The loss of light which follows is of no consequence, as in daylight work exposures are never very long. A properly corrected photographic single lens, or a rapid rectilinear, may be used, and no doubt if the results were compared critically would show to advantage, but my own opinion is that the gain would hardly be marked enough to justify the expense. On the other hand, if a daylight apparatus is to be used for slide making by reduction, then the very fine definition which we must have in the lantern slide that is to be enlarged on the sheet makes an R. R., or at least a chromatic, lens a necessity. In making a fixed focus enlarger, the position of an uncorrected lens must be determined by actual photographic tests, as the position where the picture looks sharpest will not be the position where it photographs sharpest, owing to the lens not being corrected for colour. This drawback will be found to prohibit the use of such lenses in all forms of enlarging apparatus in which the focussing is done on a screen for each enlargement.

Taking everything into consideration, then, including first cost, the best enlarging lens is the R. R.. It should be a size larger than the plate it is intended to cover; and, on this account, it should be seen that the enlarger has sufficient bellows or other extension to take it; if not, this can generally be arranged by providing an extension piece. The reduction in the price of rapid rectilinears of recent years has been so great as to put them within the reach of almost all those who can do enlarging at all.—*Photography*.

THE MONTHLY COMPETITION

It was necessary to omit the competition again from this month's issue, on account of the small number of meritorious prints entered. Many of our readers write us from time to time, commenting on the difficulty in securing awards. Prize winners in other contests especially have found fault with their lack of success in the PHOTOGRAPHIC TIMES competitions. We feel, however, that the interests of our subscribers are best served by maintaining our high standard, the prime object being to make the contests of the greatest educational value possible. Help us in our effort by sending only your best work.

Trade Notes

The Report that Photo-Era was About to be Sold, which appeared in one of our contemporaries recently, is we are assured by the publisher and editor, Mr. Wilfred A. French, absolutely without foundation. We are pleased to learn that "The Organ de Luxe of Photographic Art" is to be continued under its present ownership.

Mr. French has arranged an annual photographic contest in which the readers of this magazine are invited to participate. Particulars may be obtained by communicating with the publisher.

* * * *

To the Trade.—It has come to our attention that the Lumiere N. A. Co., Ltd., J. E. Brulatour, Sales Manager, 11 West 27th Street, New York City, is now placing upon the market a film cartridge embodying a nitrocellulose support.

You are probably aware that we are the owners of United States letters patent granted to Hannibal Goodwin, No. 610,861, dated September 13, 1898, which we claim and are advised covers film supports made from flowed nitrocellulose and also the process of making them.

We have brought suit against the Eastman Kodak Company for its manufacture and sale of film cartridges embodying such nitrocellulose support, claiming infringement upon said Goodwin patent. This suit is now in active progress and will be pushed to final hearing at the earliest possible moment.

We have also brought suit against the Lumiere N. A. Co., Ltd., and J. E. Brulatour for selling in this country their so-called Lumiere orthochromatique film cartridges (planose) as an infringement upon the Goodwin patent and that suit will also be vigorously prosecuted.

You will therefore take notice that we claim that any and all persons using or dealing in said Eastman or Lumiere film, cartridges or any other embodying a flowed nitrocellulose support are infringers upon said Goodwin patent and will be held strictly accountable, in damages and profits, for said infringement.

The well known Ansco film is the only one manufactured under the authority of the Goodwin patent.

The Goodwin Film and Camera Co.
July 8, 1907.

* * * *

Answer to Circular of the Goodwin Film & Camera Co. of July 8, 1907.

Republication from Kodak Trade Circular of September, 1901, and March, 1903.

"A Misleading Statement."

(Republished from the Kodak Trade Circular of Sept. 1901.)

During the lifetime of the Rev. Hannibal Goodwin, various absurd stories were circulated concerning his alleged connection with film photography. We have never taken any notice of these stories owing to their obvious sensationalism, although they always dragged in the name of this company in a way that implied or directly charged that we were using, without authority, a process belonging to Goodwin. However, the affair having been brought up anew by the recent publication of a statement (fathered by the persons who, it appears, have recently acquired an interest in the Goodwin patent for the evident purpose of making a strike by trying to unload it on us), we think it perhaps worth while to use a little space in this circular in giving our customers some of the rock-bottom facts in regard to this patent of straw. The following is the misleading statement, referring to patent No. 610,861, dated September 13, 1898, granted to the Rev. Hannibal Goodwin, of Newark:

"* * * consequently it is a foundation patent in the film business, and owing to the scope of its claims it is believed to occupy a controlling position in regard to other patents. Owing to various interference proceedings in the patent office, the issuance of the patent was delayed, but they give it the advantage of having been practically litigated in the office before it was issued.

"The Eastman Company filed two applications—one through H. M. Reichenbach, the other by Mr. Eastman—and endeavored to obtain the patent. The result of the interference proceedings was that the Eastman Company were obliged to acquiesce in the decision awarding priority to Mr. Goodwin, a subsidiary patent only being granted to his opponents. Then followed a long series of proceedings against the issuance of the Goodwin patent; they lasted a long time and included an exhaustive examination of the entire prior art for references against it. The result, however, was the allowance of the patent to Mr. Goodwin."

The facts of the matter are that Goodwin, after he had learned of our success in perfecting a process for the manufacture of rollable transparent films, and after we had successfully marketed such films, raked up an old application which he had sleeping in the Patent Office, copied into it a lot of matter he obtained from us, and then tried to raise an issue in an interference proceeding with the Reichenbach application. After a hot fight we made him show up what he had in his original application, and obtained a decision from the Commissioner of Patents which put on him the burden of proving that he had first made the invention. This decision was as follows:

"It is found that Goodwin did not claim the improvement in controversy nor make a statement of invention equivalent thereto until after the same was claimed by Reichenbach, wherefore the burden of proof is on Goodwin."

Goodwin did not attempt to support this burden, obviously because he could not, and decision of priority was made in favor of our assignor. Afterwards Goodwin disclaimed our process under his oath.

The other application referred to, the one by Eastman, was for a machine for making the film, and it was granted without controversy. There is nothing on record so far as we know to indicate that Goodwin ever got as far as the mechanical side of the problem. The Eastman machine was the first successful one for making transparent support in long lengths. It is still in use, and has probably made ninety per cent. of all the rollable transparent film used by the public up to the present time.

It will thus be seen that the Goodwin patent was litigated in the Patent Office, but clearly in our favor.

We do not think Goodwin ever had any workable process for making a transparent film. If he had, we never heard of his using it or anyone else making any use of it. Certainly we have never used any process except the one he disclaimed under oath.

It is self-evident, therefore, that the statement that Goodwin won against us in the Patent Office and that he obtained a controlling patent for making a transparent film is absolutely false. The owners of the Goodwin patent have not even the proverbial "half a truth" on which to base their claims. We consider their absurd statements beneath notice, and should pay no attention to them, except that continued silence on our part, and continued reiteration of garbled facts on theirs, might, in time, lead the trade to a misunderstanding of the facts as they exist."

WILL PROTECT CUSTOMERS.

The above article is republished from our issue of September, 1901. It is a full answer to statements which have been recently made in circulars sent to the trade by parties trying to bring up the Goodwin matter again. In addition to the above we might say that our customers are little interested in the matter, for we shall vigorously contest it in the courts and we shall take care of our customers as well as ourselves.

EASTMAN KODAK CO.,
Rochester, N. Y.

Notes, News and Extracts

There will be a Photo Exhibit in connection with the Taunton, Mass. Fair, Sept. 17, 18, 19 and 20 this year.

Suitable awards will be given as has been the custom during the past seven years.

Exhibits from outside of New England are particularly invited for the purpose of comparison with the best work of the leading New England amateur photographic clubs.

Information may be had of John Truex, Ch. Photo Com., P. O. address Taunton, Mass.

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The Photographers' Association of the Pacific Northwest will hold its annual convention at Seattle, Wash., September 3, 4, 5, 6 of this year. Exhibits should be shipped to reach Seattle not later than September 2. For further information address O. W. Pautzke, Secretary-Treasurer, Ellensbury, Wash.

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International Photographic Exhibition, Dresden, 1909.—Since his Majesty, the King Frederic August of Saxony has been willing to become Patron of the Exhibition, and his Royal Highness Prince John George, President of the honorary committee, a lively interest has been awakened in all circles. The beginning of September a comprehensive programme in several languages will be issued. A large participation especially from abroad is certainly to be expected. The importance of the Exhibition which should exceed all previous undertakings of the same kind, is characterized by the fact that the photographic exhibitions already planned for 1909 at Munich and Florence were postponed in consideration of the Dresden Exhibition. All information to be obtained at the office of the Exhibition, Hotel Stadt Berlin, 1 Neumarkt.

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A Note on Stops.—Beginners are often wisely told to choose a stop for constant use, and to stick to it, but though this advice is sound up to a certain point it does not meet every requirement. Stops have several uses. Probably the most important function that they fulfil is the correction of that defect in lenses known as "spherical aberration," which means that the outer portion of a lens does not focus the image on the same plane as the center part; thus every lens is fitted with a diaphragm aperture below which definition cannot be obtained. It naturally follows, therefore, that a small stop gives more detail than a large one. Unfortunately, this is not the only effect produced, for not only is definition increased, but objects at varying distances are brought to the same plane, so that atmosphere and perspective are lost. It is evident, then, that the use of a very small aperture is inconsistent with the artistic rendering of an open scene with middle and far distances, and that its use is only legitimate when photographing objects which are already on the same plane.

A second very advantageous use of stops lies in the graduation of exposure. The correct exposure, for example, at any time, might be one-eighth of a second with F/8, and this be a division of time not possible with a cap, or not given on the automatic shutter. In such cases the insertion of a smaller stop may bring the exposure within practical reach, while for those who work with a meter the calculation is done instantly, and entails no further trouble than the turning of the dial.

* * * *

Plate Backing Mixture.—The following formula is intended for use with paper, although we certainly cannot recommend anything but a direct coating on the back of the plate. It can, however, be satisfactorily used in that way, if you have no objection to the difficulty of its removal:

Gelatine	50 gr.
Water	1 oz.

Soak until quite soft, and then dissolve by heat adding

Glycerine	¼ oz.
Ivory black	30 gr.

EMULSION FOR PRINTING-OUT LANTERN SLIDES.—There are dozens of formulæ in existence, of which the following is representative:

Gelatine (equal parts of Nelson's and Coignet's..	11.3 gm.	175 gr.
Ammonium chloride	1.16 gm.	18 gr.
Rochelle salts	3.23 gm.	50 gr.
Silver nitrate	4.86 gm.	75 gr.
Alcohol	3.5 c.c.	2 drm.
Water	142 c.c.	5 oz.

Dissolve the salts in the water, and add the gelatine. When this is quite soft, heat in a water bath until melted (raising the temperature to about 100 deg. F.), and add the silver. Add the alcohol in a thin stream, with rapid stirring, and then pour out in a porcelain tray to set. It may be washed very slightly if desired; but too much washing will prevent its printing boldly. If not washed at all, it may possibly throw out crystals as it sets on the plate; it would not do so on paper. Print deeply, and tone and fix as usual.

* * * *

TRANSFERRING FILM FROM CRACKED NEGATIVE.—This is a question which reaches us almost every week. It is some months since we answered it in extended form; the following being the full working directions: Fasten the broken negative to a piece of sound glass by means of Canada balsam—the glass side of the broken negative being, of course, in contact with the sound glass. Immerse the negative, so supported, in a weak bath of hydrofluoric acid and water—about 1 drachm of hydrofluoric acid in 8 ounces of water. In this solution the film will soon begin to frill at the edges of the plate, and may then be gradually pushed back towards the centre of the plate by means of the finger-tips, which should (in case of tender skins) be protected by thin rubber stalls. In about seven or eight minutes the film will be entirely free from the glass, and it may then be lifted and transferred to a dish of clean water, where it will rapidly flatten itself out, and may then be transferred to a piece of glass, which should have been previously prepared with a coating of gelatine made by dissolving one ounce of gelatine in twelve ounces of water. The gelatinized glass plate should be passed (in the cold water) beneath the floating film, and the film and prepared plate should be raised slowly together from the bath—expelling (by means of a camel-hair brush) any airbells that might form. The transferred film and its support may then be placed away to dry in the usual way. (2) If the stripped film is left in plain water for about twenty minutes, it will enlarge itself to a considerable extent, such enlargement being made permanent by attaching the extended film to a fresh piece of glass. (3) It does not destroy the detail in any way. If you wish the stripped film to remain the original size, it will be necessary to place it in a mixture of equal parts of methylated spirit and water for some minutes before transferring it to the new glass.

* * * *

CRACKED NEGATIVES.—Glass negatives are easily fractured, and a fractured negative is certain to be one which is valued. If the glass only is cracked and not the film, it can be removed from its original support and transferred to another glass without any detrimental effect to the printing qualities of the negative. Proceed as follows: Immerse the negative in solution of hydrofluoric acid one dram, water twelve ounces, until the film begins to frill at the edges of the glass. Then gently work the film to the centre of the plate, using the soft part of the ball of the finger, until the film has detached itself and is quite free from the broken glass. Next carefully transfer it to a dish of clean water, and allow to soak for ten minutes.At the end of this time the film will have greatly enlarged, and if required, can be left in this state. If, however, no enlargement is needed, remove to a dish of equal quantities of methylated spirit and water, until it has contracted to the original size. Then float on to a new glass which has previously received a thin coating of gelatine (a fixed and washed dry plate does admirably). Carefully smooth out any wrinkles which may have made their appearance, and place away to dry.

* * * *

THE FOREGROUND.—Of all parts of a picture the foreground may be said to be the most important, and is certainly the most difficult for the beginner to control, for if the interest lies in the middle or far distance he finds it hard to subdue the immediate foreground to its pictorial proportions or having subdued it to still leave it with a right amount of character, so that it is not rendered as a monotonous blank. Of all aids to the composition of a foreground nothing can compare in value with the phenomenon of shadow. A shadow is always fraught with interest.

"A cast shadow," said Ruskin, "is a more curious thing than we suppose. The strange shapes it gets into—the manner in which it stumbles over everything that comes in its way, and frets itself into all manner of fantastic schism, taking neither the shape of the thing that casts it, nor of that it is cast upon, but an extaordinary, stretched, flattened, fractured anatomy of its own—cannot be imagined until one is actually engaged in shadow hunting." No foreground requires trimming away if it contains glimpses of such a wonderland.

In the absence of light and shade much can be done by artificial means, though I prefer to wait and see if shadows do not come at some other time of day. This, however, is not always possible, and a blank piece of foreground has therefore to be coped with. In such cases break it up by dragging into the picture branches of trees, large stones, or other objects. Transplant shrubs and grasses and flowers in the way in which our editor is so expert, or introduce a figure. In the case of blank sheets of water throw in a large stone, and then expose while the surface is broken with the circling eddies, and the sullen reflections are made wavy and bright. These little dodges are not difficult to put into practice, and they go a long way towards getting a good picture.

* * * *

Sensitive Carbon Tissue which will Keep.—Among the various methods which have been proposed for preserving sensitive carbon tissue in a fit condition for use during a prolonged period, is the addition of ammonia to the bichromate sensitizing bath. This and the storing of the sensitive tissue in an atmosphere artificially dried, as, for example, by calcium chloride, meet all ordinary needs, and, indeed, it is doubtful whether any of the recently proposed methods are better than the old plan of using ammonia in the sensitizing solution, and storing in a calcium chloride box. Dr. Hauberrisser has studied the effect of the addition of organic bases other than ammonia. The less complex bases, such as the methylamine, appear to have answered fairly well, but, as might have been expected, the molecularly heavier bases comparable to aniline caused secondary reactions. It also would seem that there may be an advantage in using methylamine on the score of increased sensitiveness.

Treating Over-Exposed Carbon Prints.

In the old days a slightly alkaline solution was used in mounting and developing carbon tissue known to be over-exposed, or having a tendency to insolubility, or "hard," as the term is. Ordinarily the printer would put a little washing soda in the cold mounting water, say an eighth of an ounce of soda to the quart. This addition would serve to assist adhesion to the single transfer paper, or the temporary support, as the case might be, the highly insoluble gelatine often failing to adhere satisfactorily. In stripping the paper of the tissue in the warm water bath, and washing away the excess of gelatine, a larger proportion of soda may occasionally be required. As against the system of using alkali to facilitate the developing, *Apollo* (May 8, 1907, p. 103) urges the use of the highly oxidizing salt ammonium persulphate the over-exposed prints being immersed for from thirty to forty minutes in a solution containing 15 grammes of ammonium persulphate and 3 c.c. of sulphuric acid, after which the development is conducted in the usual way. It may be assumed that the immersion in the oxidizing solution is to take place after the soaked tissue has been mounted on the single transfer or the temporary support, but probably there would be no objection to using the persulphate solution instead of cold water for soaking and mounting the tissue.

* * * *

Attaching Prints to Celluloid.—Dip the print in a solution of celluloid, and then apply to the sheet of celluloid, driving out all air with a squeegee. It is advisable to pour a small pool of the solution on the celluloid, to ensure absolute contact without air. Vitrivene varnish is equally effective, and does not take so long to dry.

* * * *

Amidol Developer for Lantern Slides.—The following is good for black tones:

Water	20 oz.
Sodium sulphite	1 oz.
Amidol	40 gr.

If warmer tones are required, they can be obtained by giving more than the normal exposure, and adding a considerable quantity of ammonium bromide, but amidol is best adapted to the development of bluish-black tones.